IN THE CLAIMS:

Claims 1-11 (Canceled)

Claim 12 (New) A fiber optic current sensor comprising:

a coiled sensor fiber which encloses a current conductor; and

at least one phase delay element adjoining the sensor fiber;

wherein the phase delay of the at least one phase delay element is chosen such that a contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor at least approximately compensates for a contribution of a Verdet's constant of the sensor fiber to the temperature dependence of the sensitivity of the sensor.

Claim 13 (New) The current sensor as claimed in claim 12, wherein the at least one phase delay element has a phase delay angle whose value deviates from a phase delay angle of an ideal phase delay element.

Claim 14 (New) The current sensor as claimed in claim 12, wherein the at least one phase delay element is a $\lambda/4$ optical fiber segment with an elliptical core, and the $\lambda/4$ optical fiber segment has a length which deviates from a quarter of an odd multiple of a quarter of a beat length of orthogonal polarization modes.

Claim 15 (New) The current sensor as claimed in claim 13, comprising at least two phase delay elements, each having a fast axis, wherein the magnitude of the phase delay

angles is selected as a function of a mutual alignment of the fast axes of the phase delay elements.

Claim 16 (New) The current sensor as claimed in claim 13, wherein the magnitude of the phase delay angle is selected as a function of a sign of the contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor.

Claim 17 (New) The current sensor as claimed in claim 13 comprising:

at least two phase delay elements, each having a fast axis, the fast axes being orientated at least approximately parallel to one another;

wherein the magnitude of the phase delay angle is selected as a function of a sign of the contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor; and

wherein a) in the case of a of negative sign of the contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor, the phase delay angle is greater than a phase delay angle of an ideal phase delay element, and b) in the case of a of positive sign of the contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor, the phase delay angle is smaller than a phase delay angle of an ideal phase delay element.

Claim 18 (New) The current sensor as claimed in claim 13 comprising:

at least two phase delay elements, each having a fast axis, the fast axes being orientated at least approximately orthogonally to one another;

wherein the magnitude of the phase delay angle is selected as a function of a sign of the contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor; and

wherein a) in the case of a of negative sign of the contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor, the phase delay angle is smaller than a phase delay angle of an ideal phase delay element, and b) in the case of a of positive sign of the contribution of the at least one phase delay element to the temperature dependence of the sensitivity of the sensor, the phase delay angle is greater than a phase delay angle of an ideal phase delay element.

Claim 19 (New) The current sensor as claimed in claim 12, the current sensor comprising a Sagnac interferometer.

Claim 20 (New) The current sensor as claimed in claim 12, the current sensor comprising a reflection interferometer.